REMARKS

Claims 1-17 and 22 are pending. By this Amendment, claims 7 and 16 are amended to clarify antecedent basis.

Objection to Claims and under 35 USC § 112

Claims 7 and 16 are objected to by the Examiner because it is unclear which "color channels" of claims 1 and 10 are being referenced since claims 1 and 10 each provide for "color channel values" in two different instances. Claims 7 and 16 have been amended hereby. Withdrawal of the rejection is requested.

Rejection of Claims 1-17 and 22 under 35 USC § 103

Claims 1-17 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 7,065,236 by Marcelpoil et al. ("Marcelpoil") in view of U.S. Patent 4,090,243 by Kotera et al. ("Kotera").

Regarding claims 1 and 10, the Examiner asserts that Marcelpoil discloses a method/program for quantifying color in a sample comprising multiple colors. It is understood that the Examiner has set forth limitations of the rejected base claims along with corresponding portions of the Marcelpoil specification in parentheses as follows:

"measuring a color channel value in a plurality of pixels from a control sample comprising a single color of interest (column 8/14-23: camera 300 captures a color image of a sample 500 - the image having red, green, and blue color channel values);

defining a vector for the control sample, wherein the vector comprises a color channel value present in the control (e.g. the optical density vector OD_j given by equations 3-5 or 6-8 in

column I 1, defines a vector comprising the measured optical densities for the red, green, and blue color channels);

defining a matrix comprising each of the values of each of the color channels (i.e. the matrix formed by the equations associated with the OD vector is defined by equations 21 and 22 in column 14, in order to determine the dye concentrations C based on the known optical densities OD and absorption coefficients E - see column 1411-6);

defining a conversion matrix comprising the inverse of the matrix based upon the control measurements (i.e. the conversion matrix denoted by equation 23 in column 14 is defined based upon the measured control optical densities); measuring color channel values in an image of an experimental sample comprising a plurality of colors of interest, each of the pixels comprising a plurality of color channels (column 1619-1 4: an experimental sample having the same dyes uses in the calibration process for determining the conversion matrix is imaged in the same manner as the control sample); and

calculating the amount of a color in the experimental sample by converting the channel values in the experimental sample using the conversion matrix (column 1611 4-3 1 : the amount of color, or concentrations of the dyes, in the experimental sample is determined using the conversion matrix)." It is also alleged by the Examiner that "Marcelpoil seems to only utilize a single control sample and does not appear to disclose or suggest using a 'plurality of control samples,' as claimed" and that accordingly, "Marcelpoil does not disclose defining the vector or the matrix on the basis of an "average" of color channel values for a 'plurality of control samples.'"

Finally, the Examiner combines Marcelpoil with Kotera alleging that Kotera discloses a system (figures 1 A and 1 B) for characterizing the colors of a color sample that is very similar to that of Marcelpoil and involves the same concepts of deriving an inverse matrix of mean color

intensity values (column 511 -35) and using the inverse matrix to ascertain the colors of an experimental sample (column 5/58-66).

The rejection is respectfully traversed.

As the Examiner correctly points out, Marcelpoil does not disclose defining the vector or the matrix on the basis of an "average" of color channel values for a plurality of control samples and cites Kotera to make up for the deficiency. Kotera, however, is not applicable art that is susceptible of combination with Marcelpoil.

Marcelpoil is directed toward use of a three color camera, whereas Kotera is directed toward a system for acquiring data using a spectrophotometer to correct for effects resulting from degrees of irregularities in the thickness of color print, uneven quantities of composition in each color sample and possible color overlapping in the print. Kotera also discloses that the spectrophotometer can detect numerous wavelengths, more than that of Marcelpoil. Marcelpoil is also a system for determining concentrations of components contributing to a color, whereas Kotera is a system designed to determine the true color on a portion of sample by removing ambiguities in color detection that may at most be seen as noise in a system according to Marcelpoil.

In addition, the Kotera system uses two camera systems to scan a sample: one which scans on a "micro" level and one which scans on a "macro" level. The data from both measurements are then subjected to further probability and statistical data handling techniques to eliminate errors in ambiguous color spectral information derived from scanning prints. It is believed that Marcelpoil does not utilize information in the same fashion, but rather makes determinations based on information derived on a pixel basis. No "macro" information is obtained or utilized on Marcelpoil.

Based on the differences between the two systems, one of ordinary skill in the art would not have looked to combine the disclosures of these references. Reconsideration and withdrawal of the rejection of claims 1 and 10 is requested.

Claims 2-9 and 11-17 depend from claim 1 and 10 respectively, which are non-obvious over the combination of references cited by the Examiner. For at least this reason, claims 2-9 and 11-17 are allowable over the combination. Reconsideration and withdrawal of the rejection of claims 2-9 and 11-17 is requested.

Rejection of Claims 1-17 and 22 under 35 USC § 103

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 7,065,236 by Marcelpoil et al. ("Marcelpoil") in view of U.S. Patent 4,090,243 by Kotera et al. ("Kotera") and U.S. Patent Application Publication 2004101 14227 by Henderson et al. ("Henderson").

The Examiner alleges that Marcelpoil discloses a machine vision system (figures 1 and 2) for automated analysis of a biological sample on a slide. It is understood that the Examiner has set forth limitations of the rejected claim along with corresponding portions of the Marcelpoil specification in parentheses as follows:

a system processor (i.e. computer 350 includes a processor);

a computer program on computer readable medium (column 2012-14), the computer program comprising an image algorithm comprising instructions to cause the computer to:

measure a color channel value in a plurality of pixels from a control sample comprising a single color of interest (column 8/14-23: camera 300 captures a color image of a sample 500 - the image having red, green, and blue color channel values);

define a vector for the control sample, wherein the vector comprises a color channel value present in the control (e.g. the optical density vector OD, given by equations 3-5

or 6-8 in column 11, defines a vector comprising the measured optical densities for the red, green, and blue color channels);

define a matrix comprising each of the values of each of the color channels (i.e. the matrix formed by the equations associated with the OD vector is defined by equations 21 and 22 in column 14, in order to determine the dye concentrations C based on the known optical densities OD and absorption coefficients E - see column 1411-6);

define a conversion matrix comprising the inverse of the matrix based upon the control measurements (i.e. the conversion matrix denoted by equation 23 in column 14 is defined based upon the measured control optical densities);

measure color channel values in an image of an experimental sample comprising a plurality of colors of interest, each of the pixels comprising a plurality of color channels (column 16/9-14: an experimental sample having the same dyes uses in the calibration process for determining the conversion matrix is imaged in the same manner as the control sample); and

calculate the amount of a color in the experimental sample by converting the channel values in the experimental sample using the conversion matrix (column 16/14-31: the amount of color, or concentrations of the dyes, in the experimental sample is determined using the conversion matrix); and

output the amount of color in the experimental sample (column 17/1-19);

a monitor in operable communication with the computer (as shown in figure 1);

an input device in connection with the computer (e.g. keyboard or mouse shown in figure 2);

an optical imaging system (video microscopy system 100) in operable communication with the computer, comprising:

a movable stage (column 18/59-63);

an identification member (column 17/28-45: identification marks produced by an operator);

an optical sensing member (camera 300) in optical communication with the stage configured to acquire an image at a location on a slide and in electrical communication with the processor;

a storage member for storing the location of a candidate object or area of interest (column 17/20-64 and column 19/28-46: the memory of the computer 350 is used to store images containing markings that indicate the locations of areas of interest); and

a storage device for storing each image (column 19/22-32).

The rejection is respectfully traversed.

As the Examiner correctly points out, Marcelpoil does not disclose defining the vector or the matrix on the basis of an "average" of color channel values for a plurality of control samples and cites Kotera to make up for the deficiency. The Examiner further cites Henderson for the proposition that automated slide handling apparatus are known.

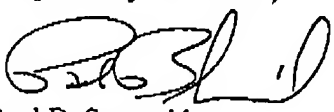
Kotera, however, is not applicable art that is susceptible of combination with Marcelpoil for the reasons set forth above. Therefore, the purported combination may not be properly cited against the invention as presently claimed. For at least this reason, claim 18 is allowable over the combination. Reconsideration and withdrawal of the rejection of claim18 is requested.

Conclusion

In view of the foregoing, it is submitted that this application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

The Examiner is invited to telephone the undersigned if the Examiner believes it would be useful to advance prosecution.

Respectfully submitted,



Paul B. Savereide
Registration No. 36,914

Customer No. 24113
Patterson, Thuente, Skaar & Christensen, P.A.
4800 IDS Center
80 South 8th Street
Minneapolis, Minnesota 55402-2100
Telephone: (612) 252-1550